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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,783	05/12/2006	Takashi Uchida	2006_0510A	3571

513 7590 03/05/2010

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EXAMINER	
LACLAIR, DARCY D	

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
03/05/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ddalecki@wenderoth.com
eoa@wenderoth.com

Office Action Summary	Application No.	Applicant(s)	
	10/575,783	UCHIDA ET AL.	
	Examiner	Art Unit	
	Darcy D. LaClair	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **1/14/2010** has been entered.

All outstanding rejections, except for those maintained below are withdrawn in light of the amendment filed on **1/14/2010**.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Double Patenting

Examiner Note: In those circumstances below where the specification has been consulted for subject matter that supports the claims under discussion, it is noted that it is appropriate to use the specification per MPEP 804: "Further, those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in the application defines an obvious variation of an invention claimed in the patent. In re Vogel, 422 F.2d 438, 441-42, 164 USPQ 619, 622 (CCPA 1970)."

Double Patenting, I

2. **Claims 1-21** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over **Claims 1-11** of **U.S. Patent No. 6,979,493 (**earlier published as **US 2003/0207122)** in view of **Harada et al**. (**US 5,981,029)**

The rejection is adequately set forth in **paragraphs 2-3** of the office action mailed **8/14/2009**, and is incorporated here by reference.

With regard to the amendment to Claims 1, 3, 15 and 17, the conflicting patent claims an aqueous dispersion comprising a gas barrier polyurethane resin having urea and urethane groups in a concentration of 30 to 42.9% by weight, where the urethane comprises a diisocyanate selected from aromatic, araliphatic, and alicyclic diisocyanates, a C_2-C_8 diol or alkylene diol, and a diamine having 8 or less carbon atoms (Claim 1-3) The claimed alkylene diol is used to introduce a hydrophilic compound, which is at least a part of the diol or diamine component; as the hydrophilic compound, dihydroxycarboxylic acids, dihydroxy C4-C10 polycarboxylic acids, and dihydroxy aromatic carboxylic acids are be used. (col 6 line 15-30) These carboxylic acids are polyhydroxyalkanecarboxylic acids. The urethane is generated through a reaction (bonding) of an isocyanate with the hydrophilic compound (carboxylic acid bearing hydroxyl groups) as at least a part of the diol or diamine component. The urethane is then chain extended using a diamine as a chain extending agent. (col 5 line 64- col 6 line18) The reaction of an isocyanate and an amine will generate a urea group, which is required by the claims. As discussed above, the conflicting patent claims an aqueous polyurethane resin, and teaches teaches a neutralizer. (See col 6 line 58-67) This neutralizing agent is mandatory in order to obtain the claimed aqueous polyurethane.

Double Patenting, II

3. **Claims 1-21** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over **Claims 1-11** of **U.S. Patent No. 6,569,533** in view of **Harada et al**. (**US 5,981,029)**

The rejection is adequately set forth in **paragraphs 4-5** of the office action mailed **8/14/2009**, and is incorporated here by reference.

With regard to the amendment to Claims 1, 3, 15 and 17, the conflicting patent claims an aqueous dispersion comprising a gas barrier polyurethane resin having a plurality of urea and urethane groups in a total concentration of 15% by weight or more (Claim 1) where the diisocyanate is selected from an aromatic or alicyclic diisocianate and a C_2-C_8 alkylene glycol, (Claim 4) and a layered inorganic compound. (Claim 6) The claimed alkylene glycol, which is a diol compound, is used to introduce a hydrophilic compound, which is at least a part of the diol or diamine component; as the hydrophilic compound, dihydroxycarboxylic acids, dihydroxy C4-C10 polycarboxylic acids, and dihydroxy aromatic carboxylic acids are be used. (col 5 line 60- col 6 line 2) These carboxylic acids are polyhydroxyalkanecarboxylic acids. The urethane is generated through a reaction (bonding) of an isocyanate with the hydrophilic compound (carboxylic acid bearing hydroxyl groups) as at least a part of the diol or diamine component. The urethane is then chain extended using a diamine as a chain extending agent. (col 5 line 64- col 6 line18) The reaction of an isocyanate and an amine will generate the claimed urea group. As discussed above, the conflicting patent claims an aqueous polyurethane resin, and teaches a neutralizer. (See col 6 line 53-67) This neutralizing agent is mandatory in order to obtain an aqueous polyurethane.

Double Patenting, III

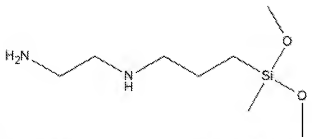
4. **Claims 1-21** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over **Claims 1-11** of **U.S. Patent No. 6,979,493 (**earlier published as **US 2003/0207122)** in view of **Zilg et al. (WO 01/04193**)

With regard to Claim 1, 6 and 15, the conflicting patent claims an aqueous dispersion comprising a gas barrier polyurethane resin having urea and urethane groups in a concentration of 30 to 42.9% by weight, where the urethane comprises a diisocyanate selected from aromatic, araliphatic, and alicyclic diisocyanates, a C_2-C_8 diol or alkylene diol, and a diamine having 8 or less carbon atoms (Claim 1-3) The claimed alkylene diol is used to introduce a hydrophilic compound, which is at least a part of the diol or diamine component; as the hydrophilic compound, dihydroxycarboxylic acids, dihydroxy C4-C10 polycarboxylic acids, and dihydroxy aromatic carboxylic acids are be used. (col 6 line 15-30) These carboxylic acids are polyhydroxyalkanecarboxylic acids. The urethane is generated through a reaction (bonding) of an isocyanate with the hydrophilic compound (carboxylic acid bearing hydroxyl groups) as at least a part of the diol or diamine component.

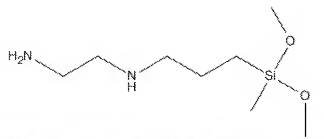
In order to obtain the claimed urea group, the is chain extended using a diamine such as hydrazine, aliphatic diamines, aromatic amines, and alicyclic amines, as well as diamines having a hydroxyl group such as 2-hydrazinoethanol. (See col 4 line 54-67) as a chain extending agent. (col 5 line 64- col 6 line18) The reaction of an isocyanate and an amine will generate a urea group. As discussed above, the conflicting patent claims an aqueous polyurethane resin, and teaches a neutralizer. (See col 6 line 58-67)

This neutralizing agent is mandatory in order to obtain an aqueous polyurethane, which is claimed. The conflicting patent further claims 0.1 to 50 parts by weight of a layered inorganic compound (Claim 6,7) which is water swellable (Claim 8), and Uchida teaches that a polyamine can be used together with the diamine chain extending compound (see col 5 line 9-11) but does not explicitly teach a type of polyamine compound.

With regard to the portion of the acid group of the polyurethane resin relative to the basic nitrogen atom of the polyamine compound, Uchida exemplifies 3-[N-(2-aminoethyl)amino] propylmethyldimethoxysilane (see Production Example 10), which is consistent with the gamma-(2-aminoethyl)amino propylmethyldimethoxysilane exemplified by applicant, having an amine value of 544 mg KOH/g (see applicant's specification p. 31 line 25-26). See the structures, below, prepared using ChemDraw Ultra:



g-(2-aminoethyl)amino propylmethyldimethoxysilane



3-[N-(2-aminoethyl)amino] propylmethyldimethoxysilane

In Production Example 9, a 25% by weight polyurethane resin, which is used with this compound in Production Example 10, uses hydrogenated XDI, dimethylol propionic acid) and ethylene glycol in similar concentrations and ratios as Production Example 1 and 3, (see applicant's specification p. 28 and 29-30) as well as a solvent and triethylamine as a neutralizer. Furthermore, Production example 10 uses these in a mixture of 500 g to 6 g (or 100:1.2 parts) (see col 15 line 5 - 14), and applicant uses these in a ratio of 100 parts of 25% by weight polyurethane solution to 1.24 parts of AEAPS. (See Applicant's Table 1) This is substantially the same chemical compounds being combined in substantially the same ratio, and therefore falls within applicant's claimed range for the acid and amine value for the respective compounds, as well as for the ratio of the acid group of the polyurethane resin to the basic nitrogen atom of the polyamine compound. See MPEP 2112.01 "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990)

With regard to the water-swellable layered compound, the conflicting patent further claims 0.1 to 50 parts by weight of a layered inorganic compound (Claim 6,7) which is water swellable (Claim 8), and defines these compounds as smectite clays such as montmorillonite and swellable micas, (See col 9 line 56-col 10 line 9) but does not claim or describe further details with regard to the use of these compounds. Zilg specifically teaches a filler mixture comprising a layered silicate such as montmorillonite

(see p. 2 par 2) and a mineral filler for use with thermosetting resins (see abstract) such as polyurethanes. (See p. 6 par 3) The mineral filler is mica, *inter alia*. (See p. 4 par 4) The swellable clays are treated with swelling agents to prepare the layered silicates. These are compounds having an onium ion, including aromatic amines and polyamines. (See p. 2 par 4) The swelling agent widens the interlayer spacing of the layered inorganic compound so that monomers can move into the interlayer space, and during subsequent polymerization, the mixture will form a nanocomposite. (See p. 4 par 2) The polyamines also play an important role in the preparation of polyurethanes, because they exhibit greater reactivity than comparable polyols. (See p. 12 par 3, 4) Therefore it would be obvious to one of ordinary skill in the art to select a polyamine taught by Zilg for use as the swelling agent for the layered inorganic compound of the conflicting patent's polyurethane composition, as it effectively functions as a swelling agent and is highly reactive with the polyurethane components, and therefore would be effective as a polymerizable component or crosslinking agent as well.

With regard to Claims 2-3 and 16-17, the conflicting patent claims a diisocyanate selected from aromatic diisocyanate, an araliphatic diisocyanate, and an alicyclic diisocyanate, a C_{2-8} diol, and a diamine having 8 or less carbon atoms (Claim 1) With regard to the isocyanate, the claim would necessitate 100% of the types of isocyanate, and the diol required by applicant.

With regard to Claims 4 and 18, the conflicting patent claims xylene diisocyanate and hydrogenated XDI (Claim 4)

With regard to Claims 5 and 19, the conflicting patent claims a layered inorganic compounds (Claim 6,7) which is water-swellable (Claim 8) and defines these compounds as smectite clays such as montmorillonite and swellable micas. (See col 9 line 56-col 10 line 9) Zilg teaches a filler mixture comprising a layered silicate such as montmorillonite (see p. 2 par 2) and a mineral filler which is mica, *inter alia*. (See p. 4 par 4)

With regard to Claims 7 and 20, the conflicting patent claims 0.1 to 50 parts of inorganic compound to 100 parts of the polyurethane resin (or 1/100 to 50/100). (Claim 7) This covers a large portion of the very broad range indicated the instant claims.

With regard to Claims 8-14 and 21, the conflicting patent claims a gas barrier composite film composed of a base film layer and a resin layer at least comprising the polyurethane resin; the polyurethane resin is used as a single-layered filmy article or a multi-layered article constructed of a base and layer(s) formed thereon. (Claims 9-11)

5. **Claims 1-21** directed to an invention not patentably distinct from **Claims 1-11** of commonly assigned **U.S. Patent No. 6,979,493** in view of **Zilg et al**. (**WO 01/04193**). Specifically, see the discussion in paragraph 4, above.

The U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP Chapter 2300). Commonly assigned **U.S. Patent No. 6,979,493**, discussed above, would form the basis for a rejection of the noted claims under 35 U.S.C. 103(a) if the commonly assigned case qualifies as prior art under 35 U.S.C. 102(e), (f) or (g) and the

conflicting inventions were not commonly owned at the time the invention in this application was made. In order for the examiner to resolve this issue, the assignee can, under 35 U.S.C. 103(c) and 37 CFR 1.78(c), either show that the conflicting inventions were commonly owned at the time the invention in this application was made, or name the prior inventor of the conflicting subject matter.

A showing that the inventions were commonly owned at the time the invention in this application was made will preclude a rejection under 35 U.S.C. 103(a) based upon the commonly assigned case as a reference under 35 U.S.C. 102(f) or (g), or 35 U.S.C. 102(e) for applications pending on or after December 10, 2004.

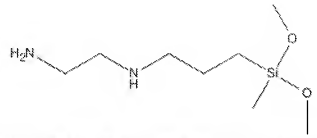
Double Patenting, IV

6. **Claims 1-21** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over **Claims 1-11** of **U.S. Patent No. 6,569,533** in view of **Zilg et al**. (**WO 01/04193**)

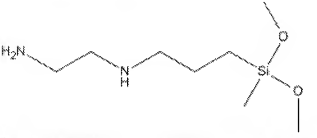
With regard to Claim 1 and 15, the conflicting patent requires an aqueous dispersion comprising a gas barrier polyurethane resin having a plurality of urea and urethane groups in a total concentration of 15% by weight or more (Claim 1) where the diisocyanate is selected from an aromatic or alicyclic diisocianate and a C_2-C_8 alkylene glycol, (Claim 4) and a layered inorganic compound (Claim 6) which is water swellable (Claim 8). The claimed alkylene glycol, which is a diol compound, is used to introduce a hydrophilic compound, which is at least a part of the diol or diamine component; as the hydrophilic compound, dihydroxycarboxylic acids, dihydroxy C4-C10 polycarboxylic

acids, and dihydroxy aromatic carboxylic acids are be used. (col 5 line 60- col 6 line 2) These carboxylic acids are polyhydroxyalkanecarboxylic acids. The urethane is generated through a reaction (bonding) of an isocyanate with the hydrophilic compound (carboxylic acid bearing hydroxyl groups) as at least a part of the diol or diamine component. The urethane is then chain extended using a diamine as a chain extending agent. (col 5 line 64- col 6 line18) Uchida teaches that the diamine used as a chain extending agents can be hydrazine, aliphatic diamines, aromatic amines, and alicyclic amines, as well as diamines having a hydroxyl group such as 2-hydrazinoethanol. (See col 4 line 48-62) Uchida also teaches that a polyamine can be used together with the diamine component. (See col 5 line 4-6) The reaction of an isocyanate and an amine will generate the required urea groups. As discussed above, the conflicting patent claims an aqueous polyurethane resin, and teaches a neutralizer. (See col 6 line 53-67) This neutralizing agent is mandatory in order to obtain an aqueous polyurethane, which is claimed.

With regard to the portion of the acid group of the polyurethane resin relative to the basic nitrogen atom of the polyamine compound, Uchida exemplifies 3-[N-(2-aminoethyl)amino] propylmethyldimethoxysilane (see Production Example 10), which is consistent with the gamma-(2-aminoethyl)amino propylmethyldimethoxysilane exemplified by applicant, having an amine value of 544 mg KOH/g (see applicant's specification p. 31 line 25-26). See the structures, below, prepared using ChemDraw Ultra:



g-(2-aminoethyl)amino propylmethyldimethoxysilane



3-[N-(2-aminoethyl)amino] propylmethyldimethoxysilane

In Production Example 9, a 25% by weight polyurethane resin, which is used with this compound in Production Example 10, uses hydrogenated XDI, dimethylol propionic acid) and ethylene glycol in similar concentrations and ratios as Production Example 1 and 3, (see applicant's specification p. 28 and 29-30) as well as a solvent and triethylamine as a neutralizer. Furthermore, Production example 10 uses these in a mixture of 500 g to 6 g (or 100:1.2 parts) (see col 14 line 52 - 54), and applicant uses these in a ratio of 100 parts of 25% by weight polyurethane solution to 1.24 parts of AEAPS. (See Applicant's Table 1) This is substantially the same chemical compounds being combined in substantially the same ratio, and would therefore fall within applicant's claimed range for the acid and amine value for the respective compounds, as well as for the ratio of the acid group of the polyurethane resin to the basic nitrogen atom of the polyamine compound. See MPEP 2112.01 "Products of identical chemical

composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990)

With regard to the water-swellable layered compound, the conflicting patent further claims 0.1 to 50 parts by weight of a layered inorganic compound (Claim 6,7) which is water swellable (Claim 8), and exemplifies smectite clays such as montmorillonite and swellable micas, (See col 9 line 55-65) but does not claim or describe further details with regard to the use of these compounds. Zilg specifically teaches a filler mixture comprising a layered silicate such as montmorillonite (see p. 2 par 2) and a mineral filler for use with thermosetting resins (see abstract) such as polyurethanes. (See p. 6 par 3) The mineral filler is mica, *inter alia*. (See p. 4 par 4) The swellable clays are treated with swelling agents to prepare the layered silicates. These are compounds having an onium ion, including aromatic amines and polyamines. (See p. 2 par 4) The swelling agent widens the interlayer spacing of the layered inorganic compound so that monomers can move into the interlayer space, and during subsequent polymerization, the mixture will form a nanocomposite. (See p. 4 par 2) The polyamines also play an important role in the preparation of polyurethanes, because they exhibit greater reactivity than comparable polyols. (See p. 12 par 3, 4) Therefore it would be obvious to one of ordinary skill in the art to select a polyamine taught by Zilg for use as the swelling agent for the layered inorganic compound of the conflicting patent's polyurethane composition, as it effectively functions as a swelling

agent and is highly reactive with the polyurethane components, and therefore would be effective as a polymerizable component or crosslinking agent as well.

With regard to Claims 2-3 and 16-17, Uchida requires the isocyanate is selected from aromatic diisocyanates or alicyclic diisocyanates for the diisocyanate component (Claim 4) and requires xylylene diisocyanate or hydrogenated xylylene diisocyanate (Claim 5). This means that these compounds would be preferentially selected, and thus used in a content of 30% or greater. Uchida requires that the diol component is a C2-8 alkylene glycol, or a polyol having 2-8 carbon atoms. (Claim 4) Uchida indicates that in view of the required gas barrier properties, aromatic diisocyanates and alicyclic diisocyanates (see col 3 line 57-63) and low molecular diol such as a C_{2-8} diol is used, and a C_{2-6} diol are preferably employed. This would lead one of ordinary skill in the art to select these compounds preferentially, or in greater than 30% and 90% by weight, respectively.

With regard to Claims 4 and 18, requires xylylene diisocyanate or hydrogenated xylylene diisocyanate (Claim 5).

With regard to Claims 5 and 19, Uchida requires water swellable (Claim 8) layered inorganic compounds (Claim 6-7) and defines these layered inorganic compounds as swellable micas and smectite clays such as montmorillonite. (See col 9, line 55-65) Zilg specifically teaches a filler mixture comprising a layered silicate such as montmorillonite (see p. 2 par 2) and a mineral filler which is mica, *inter alia*. (See p. 4 par 4)

With regard to Claim 6, see the discussion of Claims 1 and 15, above, with regard to the portion of the acid group of the polyurethane resin relative to the basic nitrogen atom of the polyamine compound.

With regard to Claims 7 and 20, Uchida requires 0.1 to 50 parts of inorganic compound to 100 parts of the polyurethane resin (or 1/100 to 50/100). (Claim 7)

With regard to Claims 8-14 and 21, Uchida requires a gas barrier composite film composed of a base film layer and a resin layer at least comprising the polyurethane resin. (Claims 10, 11)

Claim Rejections - 35 USC § 103

7. **Claims 1-21** are rejected under 35 U.S.C. 103(a) as being obvious over **Uchida et al. (US 2003/0207122**, later published as **US 6,569,493**) in view of **Harada et al. (US 5,981,029**)

See the discussion in **paragraphs 2-3** of the office action mailed **8/14/2009** and above, in **paragraph 2**.

8. **Claims 1-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Uchida et al. (US 6,569,533**) in view of **Harada et al. (US 5,981,029**)

See the discussion in **paragraphs 4-5** of the office action mailed **8/14/2009** and above, in **paragraph 3**.

9. **Claims 1-21** are rejected under 35 U.S.C. 103(a) as being obvious over **Uchida et al.** (**US 2003/0207122**, later published as **US 6,569,493**) in view of **Zilg et al**. (**WO 01/04193**)

See the discussion above, in **paragraph 4-5**.

10. **Claims 1-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Uchida et al. (US 6,569,533**) in view of **Zilg et al. (WO 01/04193)**

See the discussion above, in **paragraph 6**.

Response to Arguments

11. Applicant's arguments filed **1/14/2010** have been fully considered. Specifically, applicant argues

(A) Uchida has already been discussed in applicant's previous response. Harada discloses a gas-barrier film of a water-soluble or dispersible polymer, inorganic stratified particles, and an amine. This includes urethane based high polymers, yielding an improvement in adhesiveness and post-lamination gas barrierability. The amines include diamines and gamma-(2-aminoethyl)-aminopropyltrimethoxysilane and gamma-(2-aminoethyl)-aminopropyldimethyoxysilane. The cited references do not, however, teach or suggest the combination of the polyurethane resin having the acid group and the polyamine compound. In this regard, Uchida is cited, however the combination of the swelling inorganic layered compound and the polyamide could not have been arrived at from Uchida, since the polyurethane resin in Example 9 does not contain the

swelling inorganic layered compound. It should also be noted that the diamine and polyamide exemplified as the chain extending agent are incorporated into the polyurethane skeleton by reacting an isocyanate group of the prepolymer with the amino group of the diamine and/or polyamine, thus the diamine and/or polyamine are not present in the free form in the aqueous polyurethane resin. Harada further does not teach the carboyxl groups of the polyurethane; there are various water soluble or water dispersible urethane based polymers such as polyurethane having a hydrophilic unit, a polyurethane emulsified with surfactants, or a emulsion-polymerized prepolymer having a urethane bond or linkage. Harada does not teach the meaning or importance of the carboxyl groups, and does not provide guidance for combined use of the polyurethane resin having the carboxyl group and a free amino compound. Applicants further note that the polyamine compound is not bonded to the polyurethane resin, and is present in the free form, as is apparent from the fact that the polyamine is interposed between the layers of the layered inorganic compound. Thus even if Uchida were combined with Harada, the skilled artisan would not necessarily arrive at the ratio of the acid group (carboxyl) to basic nitrogen as presently claimed, and it would not be predictable or obvious over the combination of cited references.

According to the present invention, gas barrier properties are remarkably improved; as shown in comparative examples 1-2, the absence of the polyamine deteriorates the oxygen permeability, and the absence of the inorganic layered compound provides higher oxygen permeability. Contrary to these findings, combining

the inorganic layered compound with polyamine improves the oxygen permeability. These synergistic effects are not predicted by the cited references.

12. **With respect to argument (A),** applicant's arguments have been considered but are ***not* persuasive**. Although applicant asserts that the combination of the references do not teach or suggest the combination of the polyurethane resin and the polyamine compound, this is not accurate. Uchida teaches that a polyamine can be used together with the diamine chain extending compound (see col 5 line 9-11) in the preparation of the polyurethane. The polyamine can also be used as a crosslinking agent. (see col 4 line 49) In this case, the polyamine would not be reacted into the backbone of the urethane, but used after the urethane and layered compound were combined, to cure the composition. In either case, Uchida specifically teaches the inclusion of a polyamine in the resin composition. Applicant has cited Uchida's example 9, which does not contain the swelling inorganic layered compound, however this does not negate a finding of obviousness under 35 USC 103 since a preferred embodiment such as an example is not controlling. Rather, all disclosures "including unpreferred embodiments" must be considered. *In re Lamberti* 192 USPQ 278, 280 (CCPA 1976) citing *In re Mills* 176 USPQ 196 (CCPA 1972). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a polyamine given that Uchida teaches one. Furthermore, although this particular recitation of Uchida does not specify a polyamine present in the free form in the aqueous polyurethane resin, the **instant claims do not require that the polyamine be present in free form**. In fact, the instant claims recite

a polyamine ***compound***, and a polyurethane resin, which does not imply that these are two separate resins. Applicant indicates that the polyamine is interposed between the layers of the layered inorganic compound, however it is noted that the features upon which applicant relies (i.e., polyamine interposed between the layers of the inorganic compound) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, applicant's specification indicates that the polyamine may be added at an arbitrary stage: to the dispersion liquid of the inorganic compound, or to a liquid containing the polyurethane resin. (See p. 25 line 10-13) Therefore it is not clear that the polyamine would not react with the polyurethane. Additionally, the order in which the addition is made is a process, rather than a product, and absent a showing that the process is critical, the determination of patentability is made on the basis of whether the limitations in the product claim are met by the prior art.

Applicant has indicated that the secondary reference, Harada, does not teach the carboxyl groups. This is not relevant, as Uchida, the primary reference, does teach the carboxyl groups. Specifically, Uchida teaches that in order to prepare an aqueous dispersion, a hydrophilic group is be introduced to the prepolymer used to generate the urethane through a reaction of an isocyanate with a hydrophilic compound. (col 5 line 64- col 6 line18) As the hydrophilic compound, dihydroxycarboxylic acids, dihydroxy C4-C10 polycarboxylic acids, and dihydroxy aromatic carboxylic acids are be used. (col 6 line 15-30) Uchida further provides Production Examples 8 and 9 where isocyanate

and polyhydroxyalkane carboxylic acid are mixed together, neutralized, and then chain extended. (See Col 13-14)

Finally, applicants have discussed that the absence of the polyamine or inorganic layered compound would not yield the gas barrier properties of the invention, however the combination of the prior art includes both polyamine and inorganic layered compound. Therefore the appropriate comparison would be between a composition having all these present in the manner discussed, but not claimed, by applicant, and having all these present in the manner in which applicant suggests the prior art teaches, namely, with the polyamine added to the polyurethane and layered compound, rather than definitively interspersed between the layers of the inorganic compound.

It is noted that upon further consideration, the bonding of the chain extension agent through a urea group to form a polyurethane would be expected by one of ordinary skill in the art, and therefore no new matter rejection, as suggested in the response to after final, is applied. However as the amendment made after final contained new issues, the grounds for refusal to enter remain valid.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lindsay et al. (WO 03/059817) which teaches a nanocomposite of layered clay having enhanced barrier properties (p. 3) using polyurethanes including xylene diisocyanate), which can include diamine compounds (p. 12) and polyamines and chain extenders (p. 14).

Yoo et al. (KR 2002017569, see Derwent Abstract) which teaches clay containing polyurethane prepared by combining an isocyanate, polyol, polyacid, and polyamine.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Darcy D. LaClair whose telephone number is (571)270-5462. The examiner can normally be reached on Monday-Friday 8:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on 571-272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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